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Research Frontiers, Spring 2004

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University of Arkansas Fayetteville. Office of University Relations. (2004). Research Frontiers, Spring 2004. *Research Frontiers*. Retrieved from <https://scholarworks.uark.edu/research-frontiers-magazine/5>

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U N I V E R S I T Y O F A R K A N S A S

RESEARCH FRONTIERS

S P R I N G 2 0 0 4

**Examining Aspects
of Food Law**

**Charting a New
Course for Suburbia**

**Tracking Earth's
Elusive Creatures**

**Researching
Recipes**

I n t e r n e t : w w w . u a r k . e d u





John A. White
Chancellor



Fayetteville, Arkansas 72701

Office of the Chancellor
<http://uark.edu/>

Message from the Chancellor:

From improving rural transportation to tracking terrorists around the globe, cutting-edge UA research is leading the way to a better Arkansas and a better world. And the word is spreading! University of Arkansas research is gaining the notice and support it warrants from leaders across America.

Four years ago, I invited a group of more than 90 business, education and government leaders—called the 2010 Commission—to help study and present the case for the importance of The University of Arkansas in the state's cultural and economic future. Their first report, *MAKING THE CASE*, met with great success both nationally and internationally.

On March 2, the Commission released its follow-up report, *PICKING UP THE PACE*, now available online at <http://www.uark.edu/2010.html>. Printed copies can be obtained by request at chancell@uark.edu.

PICKING UP THE PACE makes a number of recommendations for fueling the improvement of both the state of Arkansas and The University of Arkansas. Among its most compelling arguments is the need for increased support of The University of Arkansas' research mission. The Commission recognizes that the UA research mission will lead to "new products, processes, discoveries, insights, and interpretations necessary for economic and cultural progress." UA research will spawn start-up businesses, will foster a scientifically and technologically trained workforce, and will lead to increased dollars for the state of Arkansas.

Perhaps most illuminating is the finding that every dollar invested in university-based research in Arkansas yields an annual return on investment to the Arkansas economy of 23.2 percent. Put another way, one dollar invested in university-based research yields eight dollars to Arkansas after a period of ten years.

A passage on page 19 of *PICKING UP THE PACE* might sum up the argument best: "The 2010 Commission believes that, if Arkansas wishes to bring its scientific and technological research to 21st Century standards, its major course of action must be to invest heavily in The University of Arkansas."

I couldn't agree more. Thumb through the pages of Research Frontiers and you will see that University of Arkansas research is leading the state, the nation and the world to a brighter future. With increased financial support, who knows what fantastic discoveries, innovations and cures UA research will produce?

Happy reading,

John A. White
John A. White

Chancellor, University of Arkansas

The University of Arkansas is an equal opportunity/affirmative action institution.

Good Fortune's a light and wanton Miss
Who never stays long in any one place;
A caress at your hairline—a hasty kiss—
And then she's off, without leaving a trace.

Dame Misery—oh, you needn't worry:
She's your lover for life, not by starts and fits.
She says she's not in the slightest hurry,
And settles herself by your bed, and knits.

Heinrich Heine, "Epigraph to Romanzero, Book II: Lamentationen"

—Translated by Brian Wilkie

Brian Wilkie, an eminent scholar and an accomplished teacher who spent nearly 20 years mentoring and inspiring students at the University of Arkansas, died Dec. 14, 2003. As the author of numerous books and as co-editor of the widely used anthology "Literature of the Western World," Wilkie enjoyed a distinguished international reputation.

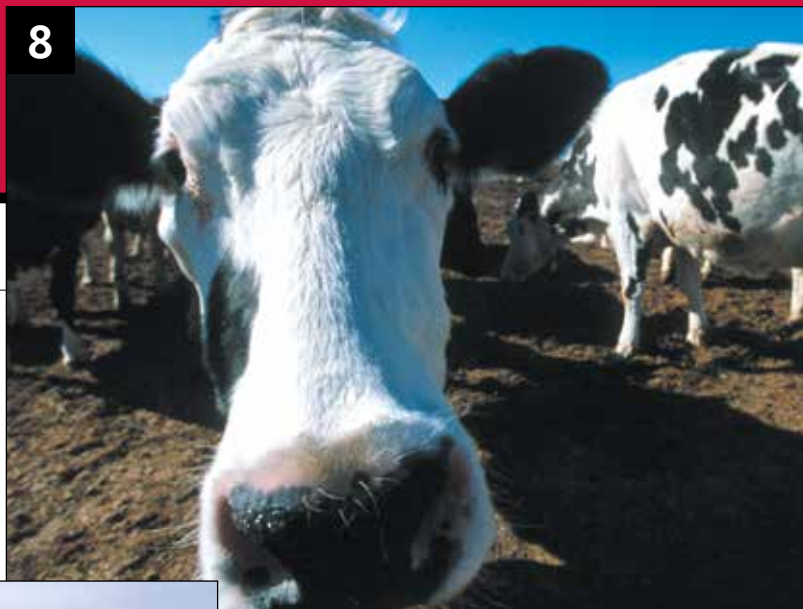
Wilkie once told a reporter that he feared on Judgment Day, he would be called before the throne of God and asked to tell, in 10 words or less, what constitutes a good poem. He said he would beg to be asked something else, but if pressed, would answer, "Poetry is what Shelley and Emily Dickinson wrote."

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COWCONSEQUENCES

The U.S. food chain supply has changed dramatically in the past three decades, and the laws that regulate agriculture, food safety and other issues also continue to evolve. The National Agricultural Law Center sorts through current issues, some of which have been brought to the forefront by the recent discovery of a cow infected with Bovine Spongiform Encephalopathy in Washington.

EVERYDAYURBANIST

Architect Steve Luoni, director of the UA Community Design Center, sets his sights on the suburban landscape, thinking about ways to transform strips, malls, highways and "big box" stores into attractive and multi-purpose centers of commerce.

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SLIMEMOLD

A team of researchers plans to scour the planet for some of Earth's most elusive and fascinating, yet repulsive creatures—slime molds. The scientists will work to inventory the biodiversity of these creatures and at the same time learn more about them.

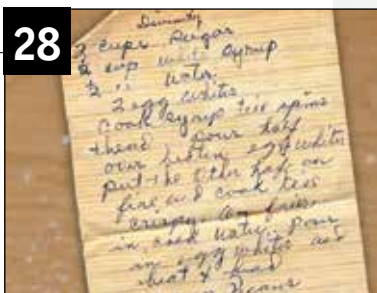
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RECIPERESEARCH

Grandma's recipes may help researchers learn more about the culture, history and sociology of another era. Mullins Library's Office of Special Collections wants to see more cookbooks, index cards and scribbles from days gone by.

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A translation of a Heinrich Heine poem by the late Brian Wilkie, professor of English.

University of Arkansas Research Frontiers is published twice a year by the Office of University Relations in the Division of University Advancement. Questions or comments should be sent to the attention of the Editor, University of Arkansas Research Frontiers, 800 Hotz Hall, 1 University of Arkansas, Fayetteville, AR 72701 or sent by e-mail to blouin@uark.edu. Associate Vice Chancellor for University Relations, Susan Rogers; Editor, Melissa Blouin; Writers, Allison Hogge, Carolyn Garcia, Kendall Curlee, Lynn Fisher, Fred Miller; Photographer, Russell Cothren; Art Director, Eric Pipkin; Design Team; Roy Cordell, Leigh Caruthers Prassel, Amanda Ryan; Dean, Graduate School, Collis Geren; Dean, Continuing Education, Donnie Dutton; Dean, School of Law, Richard Atkinson; Dean, University Libraries, Carolyn Henderson Allen; Dean, Fulbright College of Arts and Sciences, Don Bobbitt; Dean, College of Engineering, Ashok Saxena; Dean, Sam M. Walton College of Business, Doyle Z. Williams; Dean, Dale Bumpers College of Agriculture, Food and Life Sciences, Greg Weidemann; Dean, College of Education and Health Professions, Reed Greenwood; Dean, School of Architecture, Jeff Shannon. 03-209

Cover: Slime molds come in many shapes, sizes and colors, like these myxomycetes, or plasmodial slime molds, which are eating mushrooms. University of Arkansas biologists are on a mission to find, document and learn more about the biodiversity of these creatures on Earth. See page 22 to learn more.



Take Dietary Supplements With A Grain Of Salt

You can find bottles on a grocery store shelf in the vitamins and minerals section with names like “Super Charge,” “Over Drive” and “Optimum Omega.” These products promise to “enhance natural killer cell activity,” “support cardiovascular health” and “support healthy joint function.” If these promises sound too good to be true, it’s because they are, says nutrition sciences professor Jerald Foote. He says that the majority of these products—called dietary supplements—never have been tested to support the claims they make, and they vary in quality, efficacy and safety.

“There are some big gaps as far as consumer safety is concerned,” he said. “It’s a buyer-beware situation.”

Since 1994, dietary supplements have enjoyed a separate status from drugs and foods because of the Dietary Supplement Health and Education Act (DSHEA) passed by Congress. The DSHEA defines a dietary supplement as any product that is natural or is a natural metabolite and allows these products to be sold with far less regulation than food or drugs.

Foote studies contaminants in dietary supplements.

Their purity appears to vary greatly from product to product because of variations in harvesting and processing techniques. Some supplements begin their product life as bark scraped off of South American trees and put in old gasoline cans, while other supplements are harvested carefully and go through processing procedures similar to those of regulated drugs. This creates drastically different contamination levels.

In addition, Foote also counsels clients about nutrition and spends time debunking myths about dietary supplements.

If people feel they must consume dietary supplements, they should ask their physicians to advise them about potential adverse drug interactions.

Unfortunately, doctors don’t always have enough information about dietary supplements to be able to dispense information.

Dietary supplements should be evaluated on a product-by-product basis because of variations in the pharmacology, toxicology and drug interactions, even among the same type of herb. And people should be especially wary of obscure herbs.

“With the more esoteric medicinal herbs, you are setting yourself up to be a guinea pig,” Foote said. ■

A Matter Of Milliseconds:

Optical Mesh Networks Recover Rapidly

Most people don’t realize how much they rely on optical data networks in their daily lives until a cut in a cable or a faulty piece of equipment causes a split-second interruption in data flow. A massive power outage that crippled much of the northeastern United States in August demonstrated the incredible speed that optical data networks require to recover quickly from fault incidents and the serious consequences of a short interruption to critical systems.

To prevent catastrophic failures, network designers rely on highly redundant — and expensive — ring networks. But computer

engineer Kazem Sohraby has demonstrated that properly designed mesh networks can be more cost-effective and just as reliable.

Sohraby conducted his study with Kamala Murti and Ramesh Nagarajan from Lucent Technologies’ Bell Labs.

A ring or mesh optical data network can cover a metropolitan area, an entire state or a larger region. Service interruptions can occur from faults in the equipment or a cut in a cable. Standard acceptable time to restore network performance is 50 milliseconds. Until now, this restoration time has limited the adoption of mesh networks.

“We have shown that mesh networks with a proper link restoration design can achieve the same extremely short restoration time as today’s ring-shaped Synchronous Optical Networks,” said Sohraby. ■

Researchers Release Terrorism Database To Scholars Nationwide

Sociology professor Brent Smith, University of Oklahoma sociologist Kelly Damphousse and the National Memorial Institute for the Prevention of Terrorism have released a database that contains information on nearly 500 indicted terrorists, spanning two decades of federal terrorist investigations from 1978 to 1999. The information could help scholars recognize trends in terrorist activity or aid prosecutors in sending known terrorists to jail.

Cataloging 2,851 criminal counts from 121 federal terrorism cases, the American Terrorism Study database is the most comprehensive compendium of terrorism investigations and activity ever compiled in the United States.

“We could publish books off this data for the rest of our lives. The database is so complete, there’s so much information — one research team simply can’t mine it all,” said Smith. “We believe if our database can help mitigate or prevent terrorist activity, it would be selfish to restrict it for the sake of our own academic interests.”

Organized by criminal count, the database provides information on approximately 75 variables, including demographic descriptions of indicted and convicted individuals, terrorist group affiliations, intended and actual targets, and outcomes cases such as conviction or acquittal. The database grew out of a project called the American Terrorism Study, which Smith founded in 1989, when the FBI Terrorist Research and Analytical Center began furnishing him with the names and court case numbers of terrorist indictments.

Smith and his colleagues have used the American Terrorism Study database to note what criminal charges are most often leveled against terrorist suspects and which charges are most likely to result in conviction. His latest project, funded by the National Institute of Justice, will use information from the database to identify the ancillary crimes that frequently precede terrorist acts. Such early indicators of a terrorist plot could help authorities intervene and save lives.

In addition to helping academic researchers, the database will aid prosecutors in their attempts to bring terrorists to justice. ■

Fear Of Buying: Death Anxiety Influences Consumer Purchasing

Women report higher levels of death anxiety than men, but the health-related beliefs of consumers of both genders influence both the level of death anxiety and the purchase of goods typically associated with death, such as pre-planned funeral packages, according to associate professor of marketing and logistics Steve Kopp.

“Very little is understood about the consumer decision-making process in end-of-life contexts,” explained Kopp. “Our previous research found that consumers were aware of the importance of making end-of-life purchases, such as making a will, and even expressed intentions to make these purchases but did not do so. We wanted to explore what influenced consumers to act contrary to their own knowledge and expressed intentions.”

Kopp conducted his study with Swinder Janda, University of Arkansas alumnus and associate professor of marketing at Kansas State University.

Kopp and Janda examined the role of gender and the relationships between consumers’ death anxiety, assessment

of their personal health status, belief that their own behaviors control their health and their purchase of end-of-life (EOL) goods. They surveyed 305 members of a household research panel. The average age of respondents was 55, and they represented a variety of education and income levels.

The researchers found that EOL purchasing decisions were directly affected by the individual’s current assessment of health status, but the effects of health behavioral control were mediated by death anxiety. Health behavioral control is the enduring belief that an individual can have control over his or her health.

“People who expressed higher levels of perceived control over their own health experience lower levels of death anxiety, but they are also less involved with EOL purchases,” explained Kopp.

Conversely, people who felt that they had little control over their health were more likely to be involved in EOL purchases. ■



Researchers Create Tiny Holes To Examine DNA Molecules

Researchers have created a nanoscale hole that can detect individual DNA molecules, a significant step on the path to simple sequencing methods for biologically and medically important molecules.

Jiali Li, assistant professor of physics at the University of Arkansas, Jene Golovchenko, professor of physics and applied physics at Harvard University, staff scientist Eric Brandin and Harvard graduate students Derek Stein and Marc Gershow reported their findings in the journal "Nature Materials."

"These tiny holes can 'see' DNA molecules pass one by one," said Li. "They can see the details of the molecules."

One long-term goal of this research is to simplify DNA sequencing. Researchers would like to read the sequence of a single DNA molecule, instead of marching through today's difficult, time-consuming DNA sequencing technologies, which first must amplify the sample for detection, leaving ample room for error.

Li and her colleagues created the molecular microscopes using

silicon nitride to build a membrane-like surface that mimics ion channels in biological membranes. Biological membranes allow individual molecules to pass through but prove delicate and difficult to control and are not suitable for developing an integrated single molecular sensor. However, with the synthetic surface, researchers can build the silicon nitride channels and can control the size of the holes using an ion beam to change the diameter of the opening in the pore.

The nanopore chip is placed in a solution with ions in it. A voltage applied to the system causes the ions to flow through the nanopore opening. When the DNA molecule is introduced to this system, it blocks the hole as it moves through, causing the ionic current to decrease. The ionic current changes in proportion to the molecule's diameter, and the length of time the molecule blocks the hole is proportional to the length of the molecule.

The nanopore microscope also gives information on the folding of the molecule, an important component as structure determines function in the molecular world. Changes in structure can enhance or inhibit molecular properties, which can have consequences in genetic susceptibility to disease and biomedical research into new drugs, among other things. ■

How Good Organizations Go Bad

Bankruptcy, scandal and indictments seem to dominate business reporting as new instances of corporate corruption come to light daily. Organizational corruption is widespread, and is far more costly to society than street crime, according to assistant professor of management Vikas Anand.

"In most instances, the behavior creeps up on people. They are not intentionally evil, and they don't start out to be corrupt, but there are processes that take over and make their behavior seem normal," said Anand.

Anand and Blake Ashforth, Chapman Professor in Business Management at Arizona State University, identified three mutually reinforcing processes that underlie the normalization of corrupt practices: institutionalization, rationalization and socialization. Their model uses these processes to explain a variety of behaviors, including how morally upright individuals can routinely engage in corruption without experiencing conflict and how rational organizations can engage in "suicidal corruption." It will appear in the 2004 edition of Research in Organizational Behavior.

Ashcroft and Anand agree that organizational corruption is best addressed by prevention. They believe that leaders should institutionalize ethical values and awareness at all levels and hold individuals at all levels accountable for the means as well as the ends. Organizational practices should be made more transparent through practices like ethics audits or confidential hotlines, and employees should have access to the confidential advice of ethics officers and a non-threatening avenue for reporting corrupt practices, such as an independent ombudsman. ■

Federal Lands Experience Potential Growing Pains On Borders

"Gateway communities," or towns that border national parks and other federally managed lands, have attracted growing numbers of people seeking to live near the Great Outdoors. These communities and their residents have a substantial environmental impact on the federal land that attracted them to live there in the first place.

University of Arkansas researchers have found that between 1970 and 2000, the population in counties with federal lands within their borders has grown faster than population in counties without federal lands. Their findings point to a potential clash between federal conservation goals and urbanization in the absence of thoughtful planning.

Former graduate student Irene C. Frentz, now at Virginia Commonwealth University; Frank L. Farmer, professor of rural sociology; Kimberly Smith, professor of biological sciences; and James M. Guldin of the USDA Forest Service, reported their findings in the journal "Society and Natural Resources."

Once, the boundaries of federal lands were typically comprised of

spacious tracts used as cattle range and for forestry. But recent evidence points to changes in land use. Boundary tracts are being broken into smaller parcels and sold. This may affect the federal lands themselves, because the boundary lands form part of the natural ecosystem within the forests, wilderness areas and parks.

"This change in boundary land use has the potential to change the ecology of the system," Farmer said.

The researchers examined data for the 48 contiguous states, using Census Bureau statistics from 1970, 1980, 1990 and 2000. They used maps and databases from the U.S. Geological Survey to determine county boundaries and the location of federal land parcels of 640 acres and larger.

They used Geographic Information System (GIS) software to aggregate this information.

They found that median percentage population growth was higher for counties with federal lands than for counties without, regardless of the land management agency.

The researchers said their findings serve to alert federal land managers to population pressures that may affect lands under their care. ■



Shift In Reasonable Doubt Jeopardizes Presumption Of Innocence

Most Americans learned everything they know about courtroom law from Perry Mason and Jack McCoy, including the cornerstones of the American judicial system — "presumption of innocence" and "beyond a reasonable doubt." But law professor Steve Sheppard knows that the concept of reasonable doubt is changing, and that change may do away with the presumption of innocence.

"In practice, reasonable doubt doesn't work the way we think it does," explained Sheppard. It has come to mean that the doubt must be expressed, rather than implied. He cites as an example of this Instruction One upheld by the Second Circuit Court of Appeals. This instruction defined reasonable doubt as "doubt for which you can give a reason if called upon to do so by a fellow juror in the jury room."

Although recognized by lawyers and judges, there have been

few attempts to address the problem in judicial opinions. To provoke study, Sheppard wrote the first article to address this issue, which appeared in the "Notre Dame Law Review."

Central to the issue is the instruction that a judge gives to jurors.

"Throughout history, the fundamental purpose of the instruction was to constrain the juror, to prevent the juror from acting with excessive independence," Sheppard explained. "But the legal consequences of the instruction have changed. Over time the burden upon the juror who would acquit has grown, and so the evidence necessary for the state to convict has lessened."

"One of the difficulties of the requirement of articulability is that it hinders the juror who has a doubt based on the belief that the totality of the evidence is insufficient," said Sheppard. "Yet, this is precisely the circumstance in which the rhetoric of the law, particularly the presumption of innocence and the state's burden of proof, require acquittal." ■

Photo by Russell Cohen

Birds of a Feather

By Melissa Lutz Blouin

Graduate student Sara Ress has transformed her love of birds into action. During her undergraduate years at Auburn University in Alabama, the zoology major and trained falconer worked in a raptor rehabilitation facility. During those years, she also spent a summer working at a zoo in Costa Rica. Now her interest in raptors has brought her to the University of Arkansas, where she pursues her passion through research.

Ress spent last fall in the Florida Keys, working with Hawk Watch International to trap and tag raptors on their migration pathway, which brings them over the islands. When raptors fly south for the winter, they generally avoid large bodies of water. Thus, the American kestrels, broad-winged hawks, Coopers hawks, sharp-shinned

hawks, northern harriers and other raptors fly down the narrow strip of the Florida Keys before heading over the Caribbean, creating a concentrated pathway where researchers can study the birds.

The research Ress is conducting focuses on a novel approach to tracking raptor migration patterns by studying their feathers. Although researchers and bird lovers have known about north-south migration for a long time, many of the specifics of bird migration remain unknown.

"The big question is, where are the birds migrating through the Keys coming from?" said Kimberly Smith, professor of biological sciences and Ress' adviser. "No one has looked at that in a meaningful manner."

The feathers of juvenile birds may hold the answer. It turns out that ratios of a hydrogen isotope called deuterium, found in water, vary from region to region and at different altitudes.

Researchers have mapped these variations and can pinpoint

regions where different isotope ratios appear. Animals that drink the water in a particular area pick up the isotope ratio signal, and the raptors that eat those animals also pick up the signal, which then is absorbed in their feathers. Because the juvenile birds have never migrated before, their feathers contain the isotopes of their birthplaces.

In Florida, Ress collected feathers from about 170 juvenile birds. She hopes the feathers will provide information about the young birds' birthplaces.

"By doing this, we'll be able to link their breeding and wintering grounds," and possibly pinpoint population changes, Ress said.

Ress has the feathers she collected last summer and feathers from five previous seasons—feathers from about 1,800 birds in all. From these feathers she will select about 500 that she will clean, dry, weigh and pack into a capsule to be combusted into gases. She will use a mass spectrometer at a laboratory in Canada to examine the samples. The instrument will measure the hydrogen-deuterium ratios, which then can be linked back to the individual bird's place of origin.

Ress won the Morley Nelson Fellowship, a highly competitive grant from the Conservation Research Foundation to support work in raptor research, management and conservation. Smith said the award reflects on her past and present work.

"Sara had an outstanding undergraduate career at Auburn," Smith said. Her honors thesis was published in the "Journal of Raptor Research," the top journal in the field.

Ress isn't certain about what she wants to do after graduation, but she knows it will involve working with animals, and she wants it to be meaningful.

"I hope one day to be able to educate, whether working as a biologist for the government or a non-profit group, working at a zoo or rehabilitation center, or working in some sort of environmental education program," she said. "A favorite quote of mine is, 'In the end we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught.' I believe in this strongly." ■

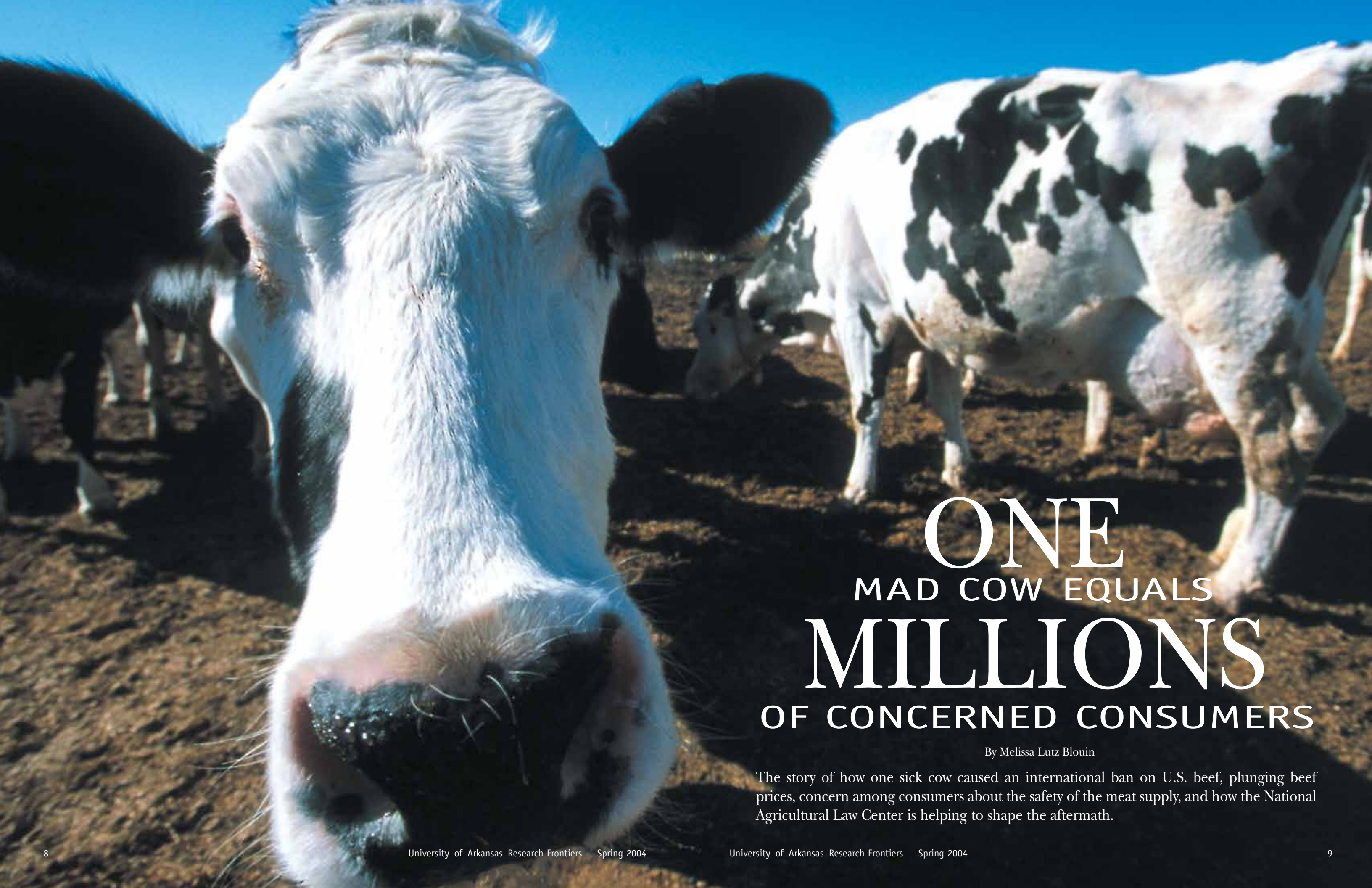


LOCATION OF RESEARCH:
Florida Keys, in Curry
Hammock State Park on
Long Point Key.



Graduate student Sara Ress spent the fall in the Florida Keys, trapping and tagging raptors on their migration pathway. Top, the researchers use a blind to watch for the birds. Second from top, Ress and her colleagues used nets to catch the birds. Top left, Ress plucked feathers from juvenile birds to use them to study the birds' birthplace. Bottom left, Ress frees a tagged bird.

Photos submitted.



ONE MAD COW EQUALS MILLIONS OF CONCERNED CONSUMERS

By Melissa Lutz Blouin

The story of how one sick cow caused an international ban on U.S. beef, plunging beef prices, concern among consumers about the safety of the meat supply, and how the National Agricultural Law Center is helping to shape the aftermath.



A cow is born on a farm or ranch.

The cow is sold at the stockyards to a feedlot company.

The cow is sent to a feedlot to gain weight.

A single, sick cow from a Washington state dairy farm has focused public and media attention on the complicated process that brings food from the pasture to the plate. But even before Agriculture Secretary Ann Veneman's Dec. 24th announcement that the cow was diagnosed with Bovine Spongiform Encephalopathy (BSE), researchers at the National Agricultural Law Center, supported by the University of Arkansas School of Law, were writing articles on laws concerning food safety issues.



Michael Roberts

Since 1996, evidence has been increasing for a causal relationship between ongoing outbreaks in Europe of a disease in cattle called BSE, or "mad cow disease," and a disease in humans, called variant Creutzfeldt-Jakob disease (vCJD). Both disorders are fatal brain diseases with incubation periods measured in years and are caused by an unknown transmissible agent. The appearance of BSE in the United States has put food safety in the public spotlight and brought scrutiny to parts of the national food supply chain that have undergone radical changes in the past few decades.

"People are starting to think differently about food," said Michael Roberts, director of the center and research associate professor of law. "They're thinking about food and agriculture in more holistic ways than ever before."

This shift in thinking may be overdue. Long gone are the days when people visited the local butcher, baker and produce seller to purchase food grown within an hour's journey of the store. Instead, food at today's supermarket comes from around the globe and has often passed through many hands before it appears in the grocery store aisles. And the change in the food supply has brought with it a host of rules, regulations, laws and other issues that affect farmers, international markets and consumer safety that in some cases have kept up with the times and in other cases have not.

"As a society, we have changed so that the old ways of farming don't always work anymore," Roberts said. "The law is responding to these changes. Our job is to equip farmers, agribusiness, the food industry and the lawyers who represent them with the information that they need so they can make informed decisions about the issues." The center provides information for the full spectrum of players in the agriculture and food sectors, including farmers, ranchers, agribusinesses and food companies. The center staff works closely with policy makers, providing objective and timely agricultural law information and analysis.

The National Agricultural Law Center was established by Congress in 1987 to address the growing complexity of agricultural law. The center's location in Northwest Arkansas places it among some of the leading food companies in the world, including Tyson Foods Inc. and Wal-Mart Stores Inc.

The researchers who work at the center examine cutting edge legal issues in agriculture and provide a clearing-house of information for lawyers, farmers, producers, processors and anyone else interested in agricultural law. In recent years, the center's scope has broadened to include the food sector, which includes industries that process, distribute and market food and fiber produced by farmers and ranchers.

Researchers at the center have amassed a large online presence, with "reading rooms" containing articles on subjects ranging from bankruptcy and biotechnology to water quality and wildlife. Christopher Kelley, law professor and former director of the center, said that before the Web, the center relied on free-standing journals to disseminate its research.

"One of the beauties of the Web is that it makes information available for all to see," Kelley said. "The information is reaching a lot more people." The features offered on the center's Web site allow lawyers and researchers to keep up-to-date with the latest cases in

different fields, creating almost an "online newspaper" about agricultural law.

"It serves as a nice complement to the graduate program," Kelley said.

The University of Arkansas offers the only advanced degree in agricultural law in the country, and lawyers seeking to work in fields as diverse as corporate law or environmental law have traveled to Arkansas to seek an LL.M. degree. The center works closely with the graduate program in agricultural law to provide a unique platform for the study of legal issues in agricultural and food law.

"The program got started in the 1980s, when agricultural law was coming to prominence as a discipline," said Susan Schneider, law professor and director of the graduate program.

The class size varies from year to year, with anywhere from six to 15 students, said Schneider. Some students come straight from law school, but others, like Schneider

herself, practice law for a few years before seeking the advanced degree. Students take courses that focus on agricultural law and write a thesis. In addition, the graduate students write case summaries pertaining to agricultural law that are posted on the center's Web site.

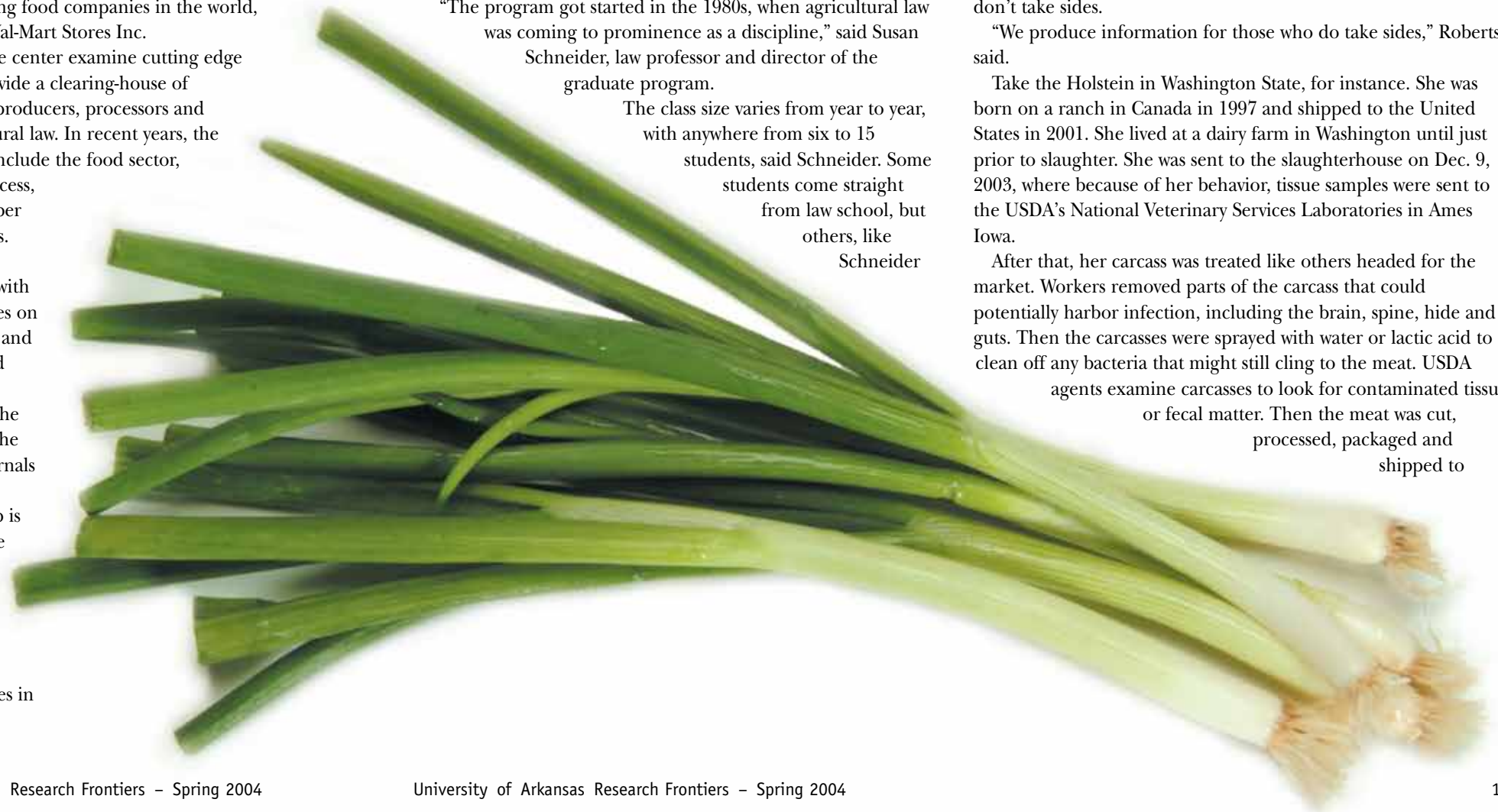
Graduates of the agricultural law program have gone to positions as congressional staff, government leaders, professors and attorneys at law firms, food companies, agribusinesses and advocacy groups.

Although graduates of the program may go on to diverse types of employment, the researchers at the agricultural law center don't take sides.

"We produce information for those who do take sides," Roberts said.

Take the Holstein in Washington State, for instance. She was born on a ranch in Canada in 1997 and shipped to the United States in 2001. She lived at a dairy farm in Washington until just prior to slaughter. She was sent to the slaughterhouse on Dec. 9, 2003, where because of her behavior, tissue samples were sent to the USDA's National Veterinary Services Laboratories in Ames Iowa.

After that, her carcass was treated like others headed for the market. Workers removed parts of the carcass that could potentially harbor infection, including the brain, spine, hide and guts. Then the carcasses were sprayed with water or lactic acid to clean off any bacteria that might still cling to the meat. USDA agents examine carcasses to look for contaminated tissue or fecal matter. Then the meat was cut, processed, packaged and shipped to



The cow is sent to the slaughterhouse for processing.

The meat from the cow is processed, packaged, inspected and possibly processed further — into meat sauce, for instance.

retail outlets and restaurants in the U.S. and beyond.

All of these stages are regulated by federal laws that come under the auspices of agencies as diverse as the EPA, the FDA, the USDA, the lesser-known Food Safety and Inspection Service (FSIS) and the Animal and Plant Health Inspection Service (APHIS).

The finding that one cow on a U.S. farm had BSE does not pose an immediate threat to the safety of the food supply, Roberts said. However, it does highlight some of the regulatory issues and legal problems that have yet to be addressed. And any resolution reached will affect everyone along the “food chain:” animals, food producers, food processors, food retail distributors and consumers.

The National Agricultural Law Center publishes research on a vast variety of topics, and the BSE scare happens to have brought many of them to the forefront of the news. These topics include stockyard regulation, international trade, food processing, consumer safety and bankruptcy. The last issue may become paramount for many if the beef industry takes a hit this year.

“This is one issue where you have every farmer sitting around the table talking about it, because it affects their livelihood,” Roberts said.

Farmers and ranchers have already started to feel the pinch. Following the Christmas Eve announcement of the first confirmed case of BSE in the United States other nations banned the import of U.S. beef. Japan, Mexico, South Korea and Canada are among more than 50 nations that have all blocked beef imports, reducing the export market by 90 percent. Exports account for about 10 percent of total U.S. beef production—nearly 26 billion pounds.

Ranchers already struggling to make a living will feel this in their pocketbooks. Keith Collins, chief economist for the USDA, has predicted that retail prices for domestic beef will fall

10 to 15 percent in the second half of this year.

The regulation of food safety and its ramifications are topics that consume much of the center’s time, and they illustrate how agriculture has changed in the past few decades. Roberts has firsthand knowledge of these changes; he grew up on a family-owned produce farm in Davis County, Utah. In later years he worked at a produce brokerage and a grocery store. He received a law degree from the University of Utah in 1989. When he decided to change careers a few years ago, he enrolled in the graduate program at the University of Arkansas for an LL.M. degree in agricultural law in 2001.

Today’s produce is as likely to come from Peru as Peoria, and Roberts’ work has followed suit. He recently took the several-thousand mile trip to visit Peru and toured an asparagus farm in a particularly remote region. Almost every worker he met wanted to know about this American holiday called “Thanksgiving.” It turned out that Thanksgiving is the season of high demand for asparagus in the United States, so during that time the workers spent many hours of overtime harvesting the green stalks to ship to Florida.

“This foreign holiday thousands of miles away has a huge impact upon their lives,” Roberts said. “The world has become much smaller.”

Although technology makes importing and exporting food easy, it raises the likelihood of importing and exporting disease. In November 2003, three people died and more than 600 sickened during an outbreak of hepatitis A believed to be caused by green onions imported from Mexico and sold to a Chi-Chis restaurant in Beaver, Penn. It was the nation’s largest known outbreak of hepatitis A. And in 1996, cities around the United States reported outbreaks of the gastrointestinal parasite cyclospora, which was later traced to raspberries from Guatemala.

In addition to these outbreaks, the food supply remains vulnerable to pathogens like listeria, salmonella and the deadly E. coli O157:H7, all of which have been found in consumer products destined for grocery stores or restaurants in recent years.

Addressing these issues means examining import/export laws, food safety regulations and standards, inspection regulations and a host of other issues and problems, things that have cropped up since the national food supply went from local to global.

In the wake of the discovery of the BSE-infected cow, Roberts and staff attorney Harrison Pittman have written an article about the legal issues surrounding the implementation of a U.S. Animal Identification Program (USAIP). Such a program was already in the planning stages as early as 2002, but the need for it became quite clear as the USDA and other government officials struggled for weeks to trace the history of the BSE-infected cow and other animals from its herd. Agriculture Secretary Ann Veneman recently announced that the plan will be expedited so that its implementation can begin as early as this summer.

Roberts and Pittman cite two areas of legal concern that might surface in any regulation of animal identification; confidentiality and producer liability. Confidentiality concerns center around two subjects: the first, what type of data will be kept; and the second, who will have access to the data. Some producers

have expressed concerns that as the USAIP currently is written, it does not sufficiently address these issues. They worry that rivals, the Internal Revenue Service or the Environmental Protection Agency or animal rights activists might gain access to the information.

“Farmers have become more savvy about how policy will affect them,” Roberts said.

The plan calls for each animal to have its own animal identification number, a lot identification number, a premises identification number and the date the animal was seen or located on the premises. The plan also suggests that information on the animal, including species, sex, age or date of birth, should be included when possible.

The current USAIP is vague on the question of who will have access to the data. It says only that state and federal officials will have access to the data when performing duties to maintain the health of the national herd. But it does not specify what federal agencies will have access, nor does it explain how freely the data may be made available to the public.

Farmers also have concerns about liability. If an animal implicated in a disease outbreak is traced back to its original farm, will that farmer be held responsible even if the animal did not pick up the disease at that location?

The proposed identification program does not specifically address the possibility of increased liability for producers, according to Roberts and Pittman. Some suggest that the identification program will not change producer liability. But the researchers point out that with traceability, farmers may be more vulnerable to lawsuits.

The researchers also looked at the concept of “strict liability,” where a product made available to the public is considered unreasonably dangerous. If strict liability applies, farmers or ranchers could be held responsible for the product even if they took measures to ensure the safety of their animals. However, Roberts and Pittman point out that courts across the country seem to vary as to whether or not they will treat a diseased animal as a dangerous product.

Since writing this article in February, Roberts has been invited to speak to agricultural and legal organizations across the country about these issues. He has visited with the Farm Foundation in

The meat is either exported, bought by grocery stores or shipped to restaurants.

The consumer goes to the grocery store or restaurant and buys the product.



Kansas City to discuss a white paper to be presented to Congress in April. He will address another producer group in April in Denver to discuss the legal issues addressed in the article.

Although the article addresses confidentiality and liability, Roberts points out that there are other issues that need resolution before an animal identification program can be implemented, including who will pay for it, what government entity will oversee it and whether it will be mandatory or voluntary.

“The law is becoming more complex and varied,” Roberts said.

Roberts is working on an article about legal issues surrounding the writing of laws to regulate recalls of food products. He has spoken to different groups about mandatory versus voluntary recall, and his understanding on the subject will continue to be in demand as these issues come before Congress.

Currently, it’s up to businesses to tell the public when and where contaminated food was sold or served. In the case of the BSE-infected cow in Washington, the USDA at first kept details from Washington and Oregon health and food safety officials, because state laws would have opened the information to the public. Consumer advocate groups call for making recalls mandatory, while businesses say the voluntary recall system already protects consumers. Roberts’ article will address the legal issues involved in creating a mandatory recall system, the components of such a system and how it should be implemented.

The expertise of the National Agricultural Law Center will continue to be sought by people nationwide who need information about the complex issues surrounding

agriculture, food and the law. The center continues to expand its influence by working with the law school to create the Food Law Journal, the only journal in the United States that is published by a law school and is devoted to the subject of food law.

The journal is supported by the center, and center staff will act as consultants for law school students as they publish the journal. Articles from the journal will be part of the center’s online presence. This work will give law students invaluable experience in researching, writing, editing and publishing.

“Everywhere you look, food’s the topic,” Roberts said. “There’s not another industry that’s as global as food and agriculture.” ■



A virtual resource

The National Agricultural Law Center is an online research and reference resource for lawyers, producers, food processors, consumers, policy makers and anyone else who has an interest in agricultural and food law issues. The center provides research, information and education as part of its mission.

In addition to Roberts, the center has three full-time staff members. Sally J. Kelley, research professor, is the center librarian. She provides reference resource services for center attorneys and those requesting information through the center. Harrison M. Pittman, research assistant professor of law, is the center staff attorney. He researches, writes and prepares research materials for publication on the center Web site and supervises the graduate assistants in the agricultural law program. Ann B.

Winfred, publicity and information specialist, designed and manages the center’s Web site, edits and formats all center publications, and handles the day-to-day business of the center.

The center’s staff has designed and posted reading rooms on their Web site that offer reference resources on topics ranging from bankruptcy to pesticides and from the Clean Water Act to the Packers and Stockyards Act. Each reading room contains an overview of the topic, major statutes, regulations, case law, other important resources and any center publications that have been written on the topic.

The research publications page includes in-depth

research articles written on agricultural and food law by center staff members, law professors, legal scholars and practitioners from across the country. On the National AgLaw Reporter section of the Web site, researchers can view current changes to regulations and judicial decisions. In addition, research assistants, graduate assistants and the staff of the center write case summaries of recent judicial developments in agricultural and food law. Again, the topics covered range from biotechnology to wildlife law and everything in between.

The reference desk includes glossaries, information on publications and links to Web sites that contain agricultural statistics. With a few clicks you can find statistics about honey prices, trout farming and peanut stocks and production. The reference desk also offers a gateway to research journals, associations, news sites and popular publication – all dealing with agricultural law.

In its pages, information seekers can find the text, history and analysis of United States farm bills dating back to the Agricultural Adjustment Act of 1938. Researchers also can find Congressional resources, including the Senate and House of Representatives committees on agriculture, the Senate and House agriculture appropriations subcommittees and the current status of agriculture appropriations legislation, and the congressional record dating back to 1999.

The center offers links to other agriculture resources, including the USDA and the FDA, the Agricultural Research Service, the Agriculture Network Information Center, the National Agricultural Library and the American Agricultural Law Association. It also contains a link to the Agricultural Law Center at Drake University School of Law, a partner to the center in numerous collaborative projects.

The Web site is: www.NationalAgLawCenter.org ■

UA Community Design Center director Steve Luoni sees beyond strip malls to tree-lined boulevards that provide space for cars, bicycles and pedestrians, as envisioned in this rendering of a road in Morrilton, Ark.



Everyday Urbanist Charts New Course for the “Geography of Nowhere”

by Kendall Curlee

Architect Stephen Luoni wants to change the world we live in—one strip mall at a time. He praises the unknown architects who built America’s silos and barns for the “poetic moments” they introduce into the landscape, but he spends his days focusing on considerably more prosaic forms of American vernacular architecture. As the new director of the University of Arkansas Community Design Center (UACDC), Luoni wants to create a sense of place in the car-ravaged suburban landscape that critic James Howard Kunstler described as a “geography of nowhere.” In just one year at the University, Luoni has addressed two structures that shape ex-urban America: the “big box” retail store and the arterial highway strip. From these ubiquitous elements of sprawl development, Luoni, with staff and students, has generated daring new design ideas, including retail towers with rooftop plazas and a “parking garden” that links retail, green space and housing.

While Luoni sees the importance of refurbishing aging downtowns, he focuses on what he calls the “middle American landscape” – the roads, housing subdivisions and office parks where Americans spend most of their time. Luoni has set an ambitious goal for the UACDC: “We want to develop new models for the public spaces that are forming in

the ‘non-places’ of suburbia,” he said. “What we’re working with at the UACDC is very different from the downtown festival markets that a lot of urban design is focused on. We celebrate the unglamorous areas of our environment and find a kind of enchantment to living in those places.”

Effecting change in this no-man’s-land is a tall order for any designer, one most architects would run from. Luoni approaches the challenge with two strategies: creating new models and protocols for urban areas, and working with the ordinary resources at hand combined in new and unexpected ways. For example, take the arterial highway strip on the outskirts of Anytown, U.S.A., typically a sea of parking, billboards, fast food and stunted grass. The strip is saturated with businesses, but there are few sidewalks, parks and other civic amenities that make it possible, and pleasurable, to do errands on foot. Luoni envisions transforming the highway strip into something akin to the traditional boulevard. The change offers social and civic benefits, responds to the ecology of the area and encourages visitors to park and walk.

Last fall, UACDC staff and students began to craft a model that transforms the highway strip into an inviting landscape. They developed design proposals for the central Arkansas community of Morrilton, where recent growth has centered

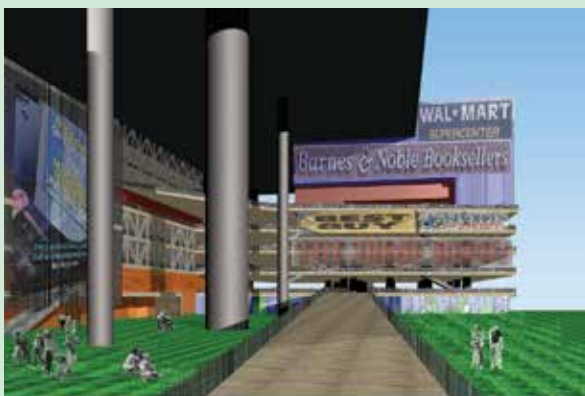
Re-thinking the BIG Box

University of Arkansas architecture students are exploring ways to bring the “big box” to the big city and winning recognition for their efforts. Under the direction of Stephen Luoni, the students spent last spring studying the idea of stacking big box retail buildings such as Wal-Mart, Sports Authority, and Best Buy into a “vertical power center” with architectural presence and unexpected amenities. Their designs recently won a prestigious Unbuilt Design Award from the Boston Society of Architects.

“This is a gutsy and imaginative study of a building typology that architects shy away from and are certainly never encouraged to explore with this combination of focus and abandon,” noted the jury.

The students’ proposals were distilled into a single 30 inch by 30 inch poster that was one of six chosen out of a field of 131 international entries. Their project is one of very few submitted by a university studio that has been so recognized.

“With land costs rising in congested metropolitan areas, the idea of stacking large retailers has been around for a while,” Luoni said, adding that the concept is complicated by the detailed store templates that individual retailers



“Walls as Advertisements,” by Trinity Simons

adopt to streamline their operations and introduce economies of scale. The conveyance systems, lift equipment and shelves in a Home Depot store are precisely calibrated to work smoothly together, for example.

Luoni worked with consultants to map the development protocols of major retailers and then charged his students with developing a high rise building with five stores that conform to these varied, and often conflicting, design templates. Each store would be completely autonomous, with separate parking, entrances, heating and air conditioning systems, and loading and waste systems. Developing a new building type challenged the students.

“We struggled with it,” said Trinity Simons. “There were so many issues to research, digest and sort through. We had to figure out how you can support a Wal-Mart seven stories up and how to move people and cars into and out of an enormous building.” The project also opened opportunities to take familiar elements from big box retail and make them more functional. Tran Le’s design, for example, replaced the gutters and curbs that typically channel parking lot runoff with a storm water retention garden that uses cattails, loblolly bays, and bulrushes to break down hydrocarbon contaminants and render them inert. Shizu Takami also introduced green space in an unlikely place. Her “Sky Room” design called for a roof lawn punctuated by large openings that admit fresh air and light into the retail space and allow for mature trees to grow indoors. Trinity Simons’ design quite literally capitalized on the large structure by cladding it with giant colored polycarbonate walls advertising the stores within. Möbius bands, bridge trusses and woven baskets were among the design inspirations for projects that would become architectural landmarks if built.



“Sky Room,” by Shizu Takami

“I was attracted to the sheer scale of the project and the opportunity to work in the mainstream,” said Sam McGuire. “It was fulfilling to address a concrete, real-world problem and create good architecture that will be experienced by many people.”

Luoni is proud of the students’ response to a difficult and unprecedented project. “The student projects in total were very impressive, with each one offering something very insightful in terms of organizational strategy,” he said. “Their work shows that studios and universities can be influential in the profession.”

Current architecture students who participated in the project include Candi Lynn Adams, Ryan Biles, Carrie Blevins, Dusty Graham, Sam McGuire, Trinity Simons, Christopher Sullivan and Shizu Takami. Jennifer Caperton, Tran Le, Maury Mitchell and Justin Staley graduated from the School of Architecture last spring. ■



The proposed parking garden would serve as a “town square,” linking big box retail, fast food establishments and conveniences such as ATM machines with adjacent housing and the community college campus.

on the arterial highway strip adjacent to Interstate 40, dissipating energy from the downtown area. Churches, a high school and a community college are located in the two-mile stretch between the strip and downtown, but the area lacks a civic presence. Focusing on planned and existing roads between the strip and downtown, the UACDC team began by creating a series of analytic maps charting the cultural geography of Morrilton’s urban development. Pointing to the maps that paper the walls of UACDC, Luoni showed that the parking lots on the highway strip dwarf the entire surface area of downtown Morrilton.

“Since the parking lot is the biggest programmatic element out here, we decided to take it on,” he said.

UACDC staff and students rolled up their sleeves and came up with a multifunctional parking plaza that radically departs from the humdrum lots that scar suburbia. Shopping cart collectors, trashcans, newspaper stands and post office boxes are embedded in green hedges. Storm water retention gardens placed throughout parking areas treat parking lot run-off, while phones, ATMs, and pedestrian promenades further enhance the functionality of the space. Groves of trees provide shade and pedestrian linkages between shopping centers developed in isolation and surrounding housing subdivisions. To effect this shift from asphalt eyesore to well-integrated oasis, Luoni envisions the creation of a “green parking authority,” a kind of public/private development tool where cities could work with retailers to create a civic space that welcomes people as well as

cars. The idea is edgy and completely new, and Luoni admits that it may not be realized in Morrilton.

“We will take it as a universal tool developed in this project, and bring it into future planning efforts, and let it mature and develop over time,” he said. The UACDC, in short, becomes a design lab for developing and incubating new ideas.

For Luoni, terminology plays a vital role in bringing a fresh perspective to design. His project title for the Morrilton studio, “highway ecology,” is not an oxymoron, but rather, suggests his aspirations for the project.

“The highway is an ecology. It is a web of relationships, and the ordinary things that are there and already budgeted into highway development become the

resources that we work with,” he said. For example, the Morrilton plan uses familiar elements such as signs, lighting, wildflowers and landscape systems to establish the community college at Morrilton as a gateway to the town.

Located at the junction of highway 9B and I40, the college currently has the look and feel of big box retail development, with roads and parking dominating campus organization. The UACDC team proposed a welcoming campus landscape composed of wildflower meadows, walking paths, parking shaded by bands of trees, and light towers that announce the campus.

The team also developed the concept of creating a “thickened highway.” Using the boulevard and other multi-functional street types as models, their design introduces spatial cues that prompt cars to slow down and share street space with pedestrians.

“Steve Luoni is expanding our notion of what is incorporated in design.”

— Bill Conway, architecture department head,
University of Minnesota

Sidewalks, hike and bike trails, parks, and other civic amenities signal that the road is a shared space, and a central median planted with storm water grasses and plants provides refuge for pedestrians crossing the highway. In UACDC's scheme, Morrilton's business highway corridor expands beyond transporting cars from point A to point B to embrace civic functions with potential to improve community health and enhance the environment – all at low cost.

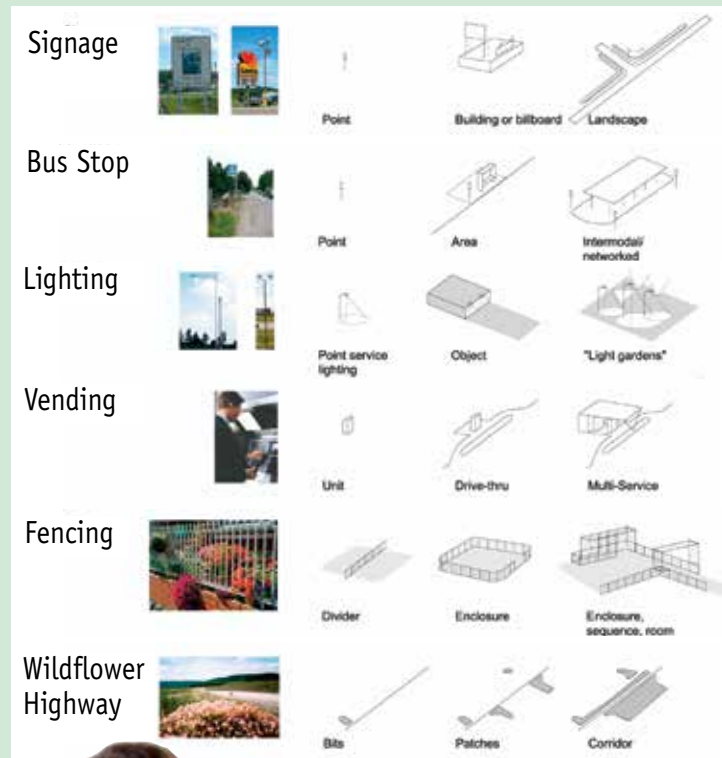
“Steve Luoni is expanding our notion of what is incorporated in design,” said Bill Conway, a long-time colleague of Luoni's who is head of the department of architecture at the University of Minnesota. “If parking is the issue, then he's going to go beyond aesthetics to think about storm water runoff, recreational possibilities for the space and how to connect the parking lot with surrounding development. He also investigates the legal and administrative machinery that determines how projects take shape. His work is fundamentally collaborative, which is how one has to work in the public realm.”

Luoni is reluctant to name influences for his innovative approach – “I look at everybody” – but he's gathered inspiration from key opportunities in his career. A native of Charleston, W.Va., Luoni earned his bachelor's degree in architecture from Ohio State University, followed by a master's degree in architecture from Yale University. The years at Yale, where Luoni supplemented architecture studies with courses in philosophy, sociology, art history and literary criticism, were influential in shaping his cross-disciplinary approach to design.

“Even at the graduate level, the humanities were important. Architecture school was, at the most, 50 percent of one's

OBJECT EVOLUTIONS

UACDC developed an index of the generic objects and systems typically found in an ordinary highway corridor, arranged horizontally from the most elemental forms to context-producing systems. Signage, for instance, ranges from the basic informational sign to signs as landscapes, as in residential subdivision entrances. By developing these elements and combining them in new ways, highway design is enhanced at low cost.



UACDC staffers Jena Rimkus and Amy Marbury look at a project directed by Luoni, far left.

Photo by Russell Cothren

education there,” he said. At the time Luoni attended, in the late '80s, Yale's School of Architecture also was pioneering a multidisciplinary approach that brought together planning, landscape architecture and architecture students in a single studio, a common practice today.

Luoni credits his years in Florida, where urban development has adversely affected fragile ecosystems, for his interest in environmental design. He taught for 13 years at the University of Florida in Gainesville, one of the schools that has led the way in environmental studies, and during that time developed a specialty in what he calls “recombinant design” – projects, like Morrilton, that combine civic infrastructure with ecological and social systems. Luoni's plans for the UACDC's future were influenced in part by his fall 2000 appointment as the Cass Gilbert Visiting Professor of Architecture at the University of Minnesota, where he was exposed to the work of Bill Morrish, then the director of the university's Design Center for the American Urban Landscape.

“Bill was really constructing discourse in Minneapolis. He would bring together the people that make decisions in both public and private realms, and he would facilitate cross-disciplinary conversations over major planning issues, the same issues that we want to look at here: environment, transportation, connectivity, neighborhood design, highway culture,” Luoni said.

Luoni looks forward to initiating this type of dialogue across Arkansas. In addition to developing design projects like Morrilton, which become labs for innovation, he is developing a research arm for the center. A class titled “Mapping the Arkansas Landscape,” which he plans to offer each semester, will explore the geography of the state and the political and economic

organizations that shape and are shaped by the landscape. This spring students are focusing on water usage and agricultural patterns in the Delta; other potential topics include transportation corridor development, tourism and the heritage industry, and musical traditions in the Delta. Eventually, Luoni plans to develop an exhibition and book about the Arkansas landscape based on the course. This research, coupled with hands-on projects, will yield new models and protocols for other designers.

“The design profession needs research organizations,”

Luoni said. “When a doctor sets out to treat a patient for cancer, he doesn't have to take on cancer research. There is a wealth of disciplinary knowledge to guide him in treating the patient. With our research, we will hopefully expand design's capabilities and develop an urbanism that positively impacts people's lives on the ground.” Stay tuned. Under Luoni's leadership, UACDC may bring a bit of poetry to a parking lot, mall or subdivision near you. ■



“Thickening” the highway corridor with pedestrian walks, bicycle trails and stormwater treatment gardens prompts cars to slow down and share street space with pedestrians and cyclists.

Project Takes School Spirit to the Streets



This plan for a linear park along Highway 9B in Morrilton, Ark. encourages physical activity. A roadside scoreboard involves passing motorists and pedestrians in the Friday night high school football game.

Through Worldwide Biodiversity Inventory

slime molds

Get Respect

Images provided by Steve Stephenson and Fred Spiegel

What researchers know about slime molds is often astonishing. Like the Terminator prototype, some slime molds can accomplish an incredible feat: if blasted into bits, the pieces will slowly find one another and ooze back together.

What scientists don't know is fascinating as well: patterns of worldwide distribution, why slime molds are found in unlikely places, to what extent the different varieties share the same genetic background.

The National Science Foundation has awarded \$14 million in funding for a bold new initiative, the Planetary Diversity Inventory, that will transform the way many scientists conduct their research. Dubbed a "worldwide scavenger hunt" in a November 2003 *Newsday* article, the project will entail finding and cataloguing all members of four very different species: slime molds, catfish, plant bugs and members of the nightshade family.

Professors Steve Stephenson and Fred Spiegel were among only 100 scholars selected to participate in the slime mold discovery initiative. They have won a \$2.075 million, five-year research grant from the NSF to compile a global inventory of Eumycetozoans, more commonly known as slime molds. The grant is the largest ever received by faculty in biological sciences at the University of Arkansas.

Typically, biologists study organisms in particular geographic areas, with the result that knowledge of a particular species can

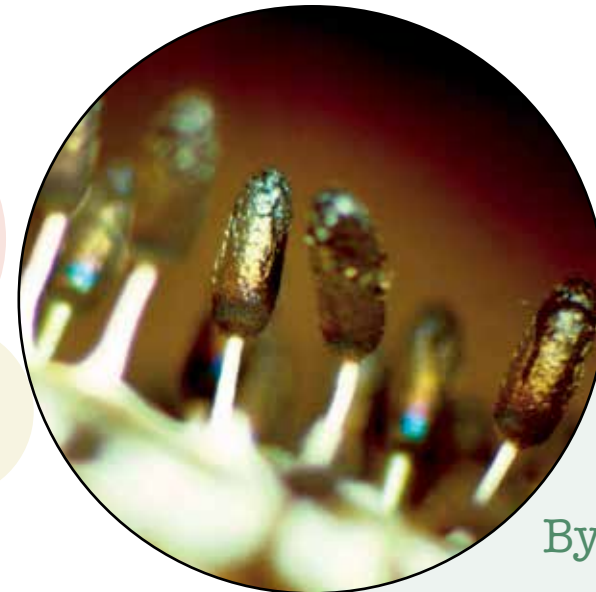
become somewhat fragmented and information hard to retrieve.

Slime molds are neither plant nor animal, and researchers want to learn much more about them. They fascinate both professional and amateur scientists. They come in a dazzling array of shapes and colors, from warty cones and smooth balls to vibrant reds and yellows. They can be found at nearly every altitude and in nearly every habitat around the world, from tropical rain forests and grasslands to deserts. Stephenson's scholarship had already taken him to six continents in search of new species. He and Spiegel have numerous field trips planned during the first year of the project, from eastern Africa to Hawaii, Costa Rica, Chile, New Zealand and Australia.

They suspect they'll find the process more like detective work than scavenger hunt.

"We'll be checking many hypotheses, such as the belief that these creatures can move around fairly easily. Similar habitats should produce similar numbers of species, but we don't have enough information worldwide to know if this is true," Spiegel said. Some places you think are too harsh, they will show up in great abundance. You might speculate that rain forests would have the highest diversity, but actually it's rather low," he said.

The research won't be as gratifying, he added, if the group doesn't end up revising existing theories. "We'll be guided by what we discover as we go along," he said. Plasmodial slime molds spend part of their lives as giant single cells with thousands of nuclei, while cellular slime molds typically



By Lynn Fisher

Opposite page, a mass of Dictyostelids, which live primarily in soil, humus and dung. **Left**, Myxomycetes, commonly called plasmodial slime molds, which produce fruiting bodies with spores.

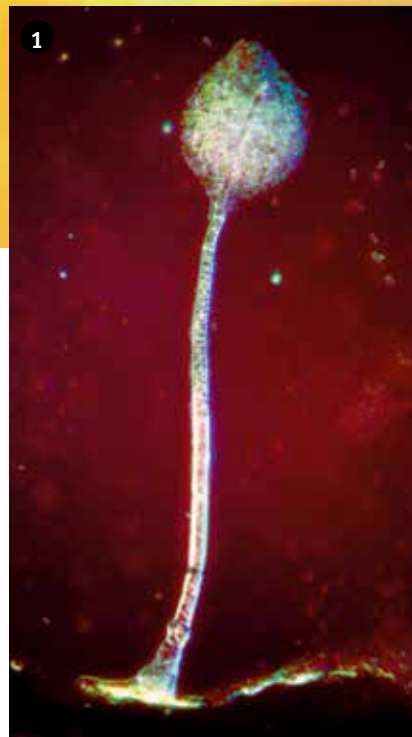
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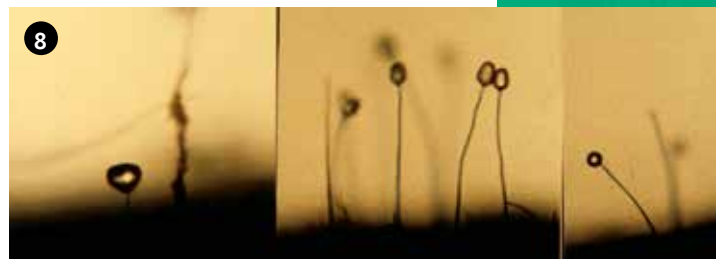
Project Goals

The UA researchers and their counterparts around the world intend to accomplish five main goals in their quest to understand the worldwide distribution of Eumycetozoans:

- 1 Conduct field-based surveys in areas of the world where information is scant or nonexistent;
- 2 Compile a major specimen database that will include not only all available records, but also numerous new records created through fieldwork;
- 3 Use information in the database to construct world distribution maps for all known and new species;
- 4 Develop a Web-based catalogue that will include specimen databases, world distribution maps and detailed information on the 1,200 to 1,300 new and already-known species catalogued during the worldwide inventory; and
- 5 Prepare students and taxonomists for careers studying and classifying slime molds.



Clockwise from left, 1. A Dictyostelid fruiting body. 2. Dictyostelid stalk cells. Testing for dictyostelids entails diluting a sample onto a petri plate where, after three to four days, a researcher will use a dissecting microscope to look for numerous spores and fruiting bodies. 3. A fruiting Protostelid. 4. Dictyostelid spores. 5. A Dictyostelid amoeba. 6. A mass of fruiting Dictyostelid spores. 7. Fruiting Protostelids. 8. Three different Protostelids, which are the simplest of slime molds, too small to be observed directly in nature.



exist as single cells, able to form a great swarm when triggered by a chemical signal. A third type remains microscopic throughout the life cycle. All are called slime molds because a “slimy” amoeboid cell eventually develops into a delicate and often beautiful spore-bearing structure that looks like a miniature mushroom.

Stephenson, who serves as project director, knows that trying to survey an entire planet for these microorganisms will be a daunting task, one that could not be attempted without the help of hundreds of other scientists and graduate students, who will assist in collecting and classifying specimens.

“Cataloguing the Earth’s life certainly is a noble goal,” said Stephenson. “I hope this is only the first of many competitions to do whole-earth inventories of species. The groundwork for our effort has existed for many years—everyone in this project had

worked together on other projects, and so we already had a closely knit team of scientists who knew one another and were familiar with the work the others were doing.”

Understanding global biodiversity is critical to understanding not only the origin of the human race and the impact people have on the environment, but also the evolution and health of the myriad species on the planet.

“It’s like dumping a puzzle on the ground and having perhaps 10 pieces turned face-side up. You can’t determine patterns when you don’t know what they are,” said Stephenson.

In addition to Spiegel and Stephenson in Fulbright College’s Department of Biological Sciences, principal researchers for the grant include James Cavender of Ohio University, Carlos Lado of the Royal Botanical Garden in Madrid, and Martin Schnittler of the

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Ernst-Moritz-Arndt University in Germany.

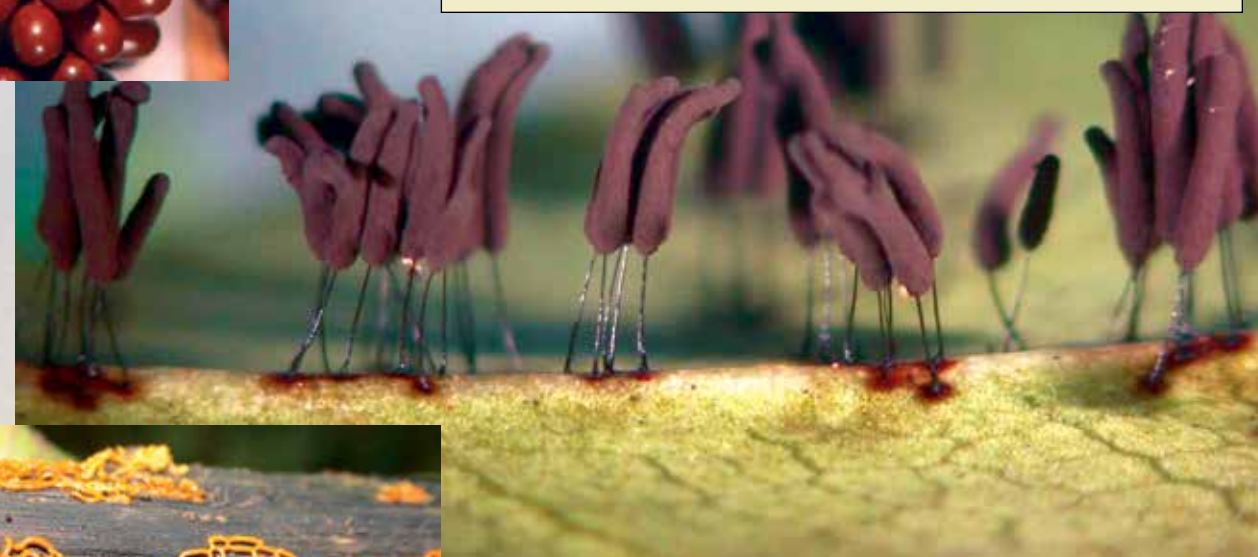
They and their colleagues across the globe will study the ecology and taxonomy of the various types of slime molds, which can be found in soil, dead plants, rotting logs, stumps and other microhabitats on every continent. Their results will be presented in a series of publications and on a Web site dedicated to the project.

“They are major predators of other microorganisms, such as bacteria, yeasts and algae, but because they have cryptic lifestyles and only a small group of specialists study them, they are among the least-researched groups of terrestrial organisms. We plan to compile a major specimen database, which we will in turn use to construct world distribution maps for all known and new species of Eumycetozoans,” said Spiegel.

Slime molds perform essential functions in a variety of ecosystems. As they break down bacteria and fungi, they release minerals back into the soil. They can actually communicate between cells and differentiate themselves into favorable shapes for survival, and so can teach scientists valuable lessons about cellular behavior.

Cancer researchers, for example, have investigated some to find out how nuclei divide.

“One type of cellular slime mold feeds on bacteria, and when it gets enough to eat, divides many times to produce a population of cells. When it begins starving, it sends out a chemical that causes all of the cells to mass together and differentiate into a sausage-shaped object resembling a slug. The slug then sits on its end. About a third of it becomes a stalk, and the other two-thirds become spores,



Did You Know?

- According to an article in “Smithsonian,” the 15th-century Flemish artist Hieronymus Bosch painted 22 species of slime molds in his triptych “The Garden of Earthly Delights.”
- Slime molds have quirky names, such as wolf’s milk, bubble gum, red raspberry, chocolate tube and tapioca.
- Morten Laane, a Norwegian biologist, has translated the pulsations of slime molds into sound, creating slime mold music. He also exposed molds to cigarette smoke, making the pulsations speed up, and to liquor, which also increased the pulsations, but not for long.

Clockwise from bottom left, 1. A Myxomycete in the spore stage. **2.** Pretty in pink: Myxomycetes eating mushrooms. Plasmodial slime molds like Myxomycetes spend part of their lives as giant single cells with thousands of nuclei. **3.** A Myxomycete in the fruiting stage. **4.** Myxomycete stems. **5.** A plasmodial Myxomycete, a precursor to the spore stage.

which are dispersed by rain or small invertebrates,” said Spiegel. “This amazing ability to communicate and organize themselves fascinates many scientists.”

The team of researchers will study where the organisms occur, how they are distributed and how they move around the planet. They will try to find out if specialization occurs in specific areas of the world and if the various molds are sharing genes.

“What we are studying essentially is the diversity of life on Earth. In the end, we’ll have a global database and be able to trace what the distribution patterns are. Several places don’t have good collection records, such as South America, southeastern Asia, sub-Saharan Africa and Madagascar. In the end, the University of Arkansas will house one of the world’s largest collections of these specimens,” said Spiegel.

In a related NSF grant, Spiegel, Stephenson and Cavender, with co-principal investigator Jean-Marc Moncalvo of the Royal Ontario Museum in Toronto, will receive \$500,000 over the next five years to foster the development of new taxonomists who research slime molds. This project is part of the NSF PEET (Partnerships to Enhance Expertise in Taxonomy) program. It is designed to ensure that groups of organisms studied by few taxonomists are not left without any new, young experts.

“In this program, our goal will be to help these scientists see themselves as integral members of the larger community of biologists. We’ll bring together experts in the taxonomy of Eumycetozoa to train new Ph.D. students as well as others already working in fields such as developmental biology, cell and molecular biology, and genetics,” said Spiegel.

The four major projects funded under the Planetary Diversity Inventory are being conducted on an unprecedented scale, says Jim Wooley, program director for the Biodiversity Surveys and Inventory Program at the NSF.

“We are really stimulating and increasing the pace at which species are discovered. It’s clear we’re not making progress fast enough if we have any hope at all of describing and characterizing the planet’s biota before it’s gone. We asked the groups we selected to tell us what it would take to get the job done completely. We hope the result is tremendous economies of scale, that participants will approach science in a way that has never been done before. Of the many requests we got for funding, these projects emerged as having the teams who could get the job done. They had everything we were looking for,” said Wooley. ■



Don't throw away Grandma's recipe cards yet!

By Molly Boyd

Archivists at the University of Arkansas are cooking up a project that will have history buffs and nutritionists alike hungering for more. Ethel Simpson, archivist at the University Libraries, is launching a project to collect materials that document the history and culture of cuisine in Arkansas: the Arkansas Cookbook Collection.

Simpson explains that cookbooks, when viewed as historic artifacts, offer a unique perspective on the cultures that produced them, often revealing cultural assumptions and anxieties, particularly those about women and domesticity. For instance, "Recipes for the King by Arkansas Chicken-Cookin' Queens," published by the Arkansas Poultry Federation in 1963, contains recipes from 20 homemakers, each chosen to be a Chicken-Cookin' Queen at one of the five District Poultry Festivals. Featured is Mrs. Harold Reese of Springdale, 1963 Queen of the Arkansas Poultry Festival, who made public appearances as a representative of the poultry industry throughout the year of her reign.

Donations of such materials to the University Libraries will not only ensure a safe repository for cherished family items but will support research for generations to come in such fields as history, sociology, nutrition and food science. Simpson notes that a large collection can provide primary sources for researchers' investigations into the history and science of food; the social and economic history of the region; the evolution of scientific and technological progress in food production and preparation; or the implications of social conditions and changes revealed in eating behaviors, food choices, habits and customs. A simple recipe collection can document the introduction of new culinary technologies, gourmet sensibilities and ethnic foods into Arkansas kitchens.

Cookbooks published by women's clubs, churches and other organizations will be of particular interest to the libraries. Among the earliest examples in the present Arkansas Collection is the 1929 cookbook of the Missionary Society of Smackover. Cookbooks created by professionals such as dieticians, extension agents, home economists and chefs constitute another category; brand name cookbooks and advertising materials created to promote Arkansas businesses and products, a third category. Also of interest are books describing foods, techniques or equipment used in Arkansas cooking. For example, the books by John Ragsdale of El Dorado on Dutch oven cookery are already in the collection, as is the publication of the Arkansas Cooperative Extension Service, "Arkansas Game Recipes," by Earl Franklin Kennamer. Advertising booklets featuring Arkansas products, such as rice, catfish, soybeans, persimmons or other foodstuffs constitute a fifth category of desired materials.

Cookbooks printed in Arkansas or about Arkansas foods may also support other areas of general Arkansas studies served by Special Collections, such as the history of the University, history of religion, women's studies or Arkansas folklore. A good example is the "Cherokee Cookbook," published by the Indian Heritage Association of the University of Arkansas in 1968. It includes the Cherokee alphabet developed by Sequoyah, and the Cherokee translation for words such as raccoon, "ger li," fish, "ah tsa di," egg, "tsu way tsi" and water, "ah ma." Another example is "The Ozark Cook Book of

Tested Recipes," compiled and edited by Mrs. W. A. Ramsey. It was published as a complimentary booklet circa 1935, paid for by advertisers near the Fayetteville square, such as the Fayetteville Mercantile, University of Arkansas Creamery, the Fayetteville Milk Company, McIlroy Bank and Trust, and Campbell & Bell Dry Goods Company.

The recipes of individuals also document local foods and family traditions. For example, the family of Susie Pryor of Camden published a collection of her recipes, "Perfectly Delicious," in 1990. An interesting family collection called "A Gathering of Tall Tales, Receipts, and Three Songs from the Ozark Dillard Family" was collected and published in 2000. A neatly-organized, loose-leaf binder of recipes collected by Betty Bumpers, wife of former Arkansas Senator Dale Bumpers, includes personal notes in addition to the recipes, such as her commentary on the recipe for flan: "This is very simple to make and absolutely sensational. The caramel comes out on top and sort of runs down the sides and no one would ever guess how easy it is. It is a Spanish dish—Sarita gave me the recipe." Following her recipe for Cold Marinated Vegetables, she noted, "Looks beautiful and should taste wonderful on a hot, muggy Washington night." And after the Sweet Potatoes with Whiskey Sauce recipe, she wrote, "I knew a man whose wife wouldn't let him drink, and every time he came to the house he absolutely guzzled that sauce—in fact, he even ate it on oyster dressing!"

Simpson is appealing to the public to contribute original and published materials that document cooking in Arkansas. Materials of interest include handwritten cards and loose-leaf notebooks of recipes, fund-raising cookbooks, even booklets promoting some of Arkansas' famous food like catfish, rice and watermelon. While food snobs may heap scorn on these foods and healthy eaters may shy away, the documents describing preparation and ways of serving food provide valuable insight into cooks' views of what was worth bragging about and worth passing on. Hence, they are valuable to the libraries' continuing search for materials that document the history, people and culture of Arkansas.

Although thumbing through your grandmother's handwritten recipe cards might bring a tear to your eye, thumbing through those same cards brings a gleam to Simpson's.

"Ah," she laughs softly while looking over one such collection. "Do you remember when velvet cake was all the rage?"

These published books are catalogued and shelved with the Arkansas Collection and are available on a non-circulating basis. Unpublished collections of recipes donated by families or individual cooks will be classified with the manuscript collections, processed for research use and described on the Special Collections Web site <http://libinfo.uark.edu/specialcollections/>. Historical materials receive priority collection emphasis, but materials of recent date will be accepted as well. Those who have cookbooks that might be added to this collection should contact Ethel Simpson at (479) 575-5577 or esimpson@uark.edu.

For recipes, please visit the Web site at http://advancement.uark.edu/pubs/Research_Frontiers/ ■

**Banana Wars: Power, Production and History in the Americas**

Edited by Steve Striffler and Mark Moberg

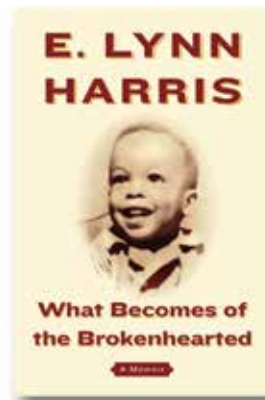
Duke University Press

Few Americans stop to consider that the sweet fruit they slice on their cereal each morning may be a product of bitter conflict. “Banana Wars,” co-edited by anthropology professor Steve Striffler and Mark Moberg of the University of South Alabama, examines the history of the banana industry and how America’s taste for this appealing fruit fueled social strife, peasant uprisings and imperialist production tactics in Central and South America.

Essays from experts in sociology, anthropology, history, economics and geography offer an overview of banana cultivation and export over the last century, focusing on the giant American and European corporations – United Fruit (Chiquita) and Standard Fruit (Dole) – that held near monopolies on banana production in the Western Hemisphere.

“The banana industry is the quintessential case of foreign intervention in Latin America,” Striffler said. “Depending on your perspective, this industry was the worst thing to happen to Latin America, in terms of U.S. imperialism, or the best thing, in terms of economic development.”

“Banana Wars” documents the struggles over territory, labor rights, government sanctions and crop diseases that plagued these plantations and chronicles corporate agriculture’s eventual retreat from the region. ■

**What Becomes of the Brokenhearted**

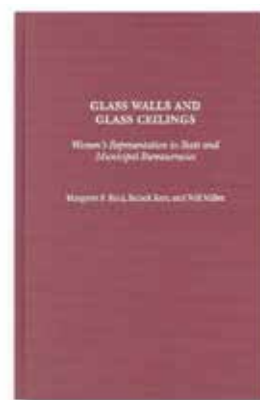
E. Lynn Harris

Doubleday

Best-selling author and visiting professor E. Lynn Harris has published eight novels, won numerous literary awards and been named among the “100 Leaders and Heroes in Black America” by Savoy magazine.

But his journey to accolades and acceptance took him through a rocky terrain of self doubt, sexual confusion and suicidal thoughts. In his new memoir “What Becomes of the Brokenhearted,” Harris carries readers across that terrain. He begins in the valley of the shadow of death, recounting his unsuccessful suicide attempt in the summer of 1990. From there, he beckons readers back, into a childhood overshadowed by an abusive stepfather, an adolescence confused by sexual questions, and a young adulthood scarred by depression and denial.

Following his suicide attempt, Harris climbed a steep slope to recovery, relying on faith and on the love of his family and friends. But what his memoir makes clear – not only by its words but by its honesty and power – is that writing lifted him higher and became a safe haven. As Harris said: “Writing has allowed me to craft and sculpt a magnificent life and touch the lives of others in ways that still awe and humble me....Writing is my lifeline. Writing saved my life.” ■

**Glass Walls and Glass Ceilings: Women's Representation in State and Municipal Bureaucracies**

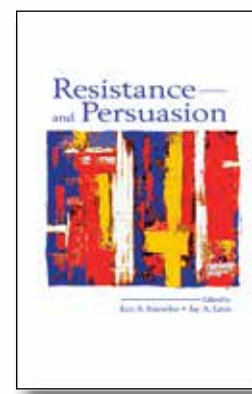
Margaret Reid, Brinck Kerr, Will Miller

Praeger Press

In “Glass Walls and Glass Ceilings,” political science professors Margaret Reid, Brinck Kerr and Will Miller examine the distribution of women and men in state and municipal administrative and professional positions by agency and over time to assess two factors. First, whether agency policy missions are associated with barriers; and second, whether, relative to white women, African-American women and Latinas have claimed more managerial positions in public-sector agencies.

Drawing from a large data set provided by the U. S. Equal Employment Opportunity Commission, the authors find continued patterns of under-representation for women in police, fire, streets/highways, utilities, transportation, community development and parks departments. However, they report greater and growing representation of women in agencies traditionally populated by women such as health, welfare and other social services agencies.

The research also reveals that white women, relative to their numbers in the population, are better represented in the upper echelons of bureaucracy than African-American women and Latinas. The researchers’ analysis suggests that the employment prospects of Latinas in management are particularly unlikely to improve over the next several years. ■

**Resistance and Persuasion**

Eric Knowles and Jay Linn

Lawrence Erlbaum Associates, Inc.

The psychologists in this volume want to make you an offer you can’t refuse. And as their research in persuasive tactics progresses, they may one day know exactly how to do it.

“Resistance and Persuasion” grew out of a symposium hosted by psychology professor Eric Knowles and his then-graduate student Jay Linn. It features papers from nationally renowned scholars of social influence on topics such as “Looking ahead as a technique to reduce resistance to persuasive attempts” and “Creating critical consumers: Motivating receptivity by teaching resistance.”

As Knowles explains, social influence and, by extension, persuasion revolve around an approach-avoidance conflict – the opposing positive and negative reactions people feel when presented with an argument or appeal. Until now, most research has focused on the approach side of this phenomenon, aiming to win people over by heightening the attractive features of an offer.

But Knowles and his colleagues believe that addressing the avoidance side of the conflict can yield more successful and satisfying results. Rather than overcoming an audience’s resistance to a message by adding enticements or arguments, these researchers have devised tactics that reduce or remove resistance altogether. ■

**Women Writers of the Journal Jugend from 1919-1940**

Kathleen Condray

Edwin Mellen Press

In the newly published “Women Writers of the Journal Jugend from 1919-1940,” assistant professor Kathleen Condray, ex-amines the themes found in women’s narratives during the Weimar Republic and the Third Reich and the images female writers created for their fellow women.

Jugend helped pioneer the development of the short story. Its editors vowed to publish any work they deemed “short and good.” The journal stood in absolute contrast to a contemporary periodical, Die Gartenlaube, which relegated women writers and women’s issues to a separate section and condescendingly addressed them as “our dear female readers.”

The Jugend editors who predicted that Adolf Hitler would be a brutal dictator ended up in concentration camps. Over the years, writers such as Friedrich Nietzsche, Rainer Maria Rilke, Johann Wolfgang von Goethe, Herman Hesse and Thomas Mann were published in Jugend, which evolved into a particularly rich source of women’s writing as well, featuring authors such as Richarda Huch and Else Lasker-Schüler.

Professor Brian Keith-Smith, compiler of “An Encyclopedia of German Women Writers,” notes in his review that Condray has conducted the only in-depth investigation of the literature of Jugend, in the process compiling the first comprehensive index of women writers during the period. ■

**Dangerous Liaisons: Sex and Love in the Segregated South**

Charles F. Robinson II

University of Arkansas Press

Why was marriage against the law? In the tumultuous decades after the Civil War, as the Southern white elite reclaimed power, “racial mixing” was the central concern of segregationists who strove to maintain “racial purity.” Segregation was based on the idea that interracial sex posed a biological threat to the white race.

In this groundbreaking study, history professor Charles Robinson examines how white Southerners enforced anti-miscegenation laws. His findings challenge conventional wisdom, documenting a pattern of selective prosecution under which interracial domestic relations were punished even more harshly than transient sexual encounters.

Robinson shows that the real crime was to suggest that black and white individuals might be equals, a notion that undermined the legitimacy of the economic, political and social structure of the white male supremacy. Robinson examines legal cases from across the South, considering both criminal prosecutions brought by states and civil disputes over marital and family assets. “Dangerous Liaisons” vividly documents the regulation of intimacy and its fundamental role in the construction of race. ■

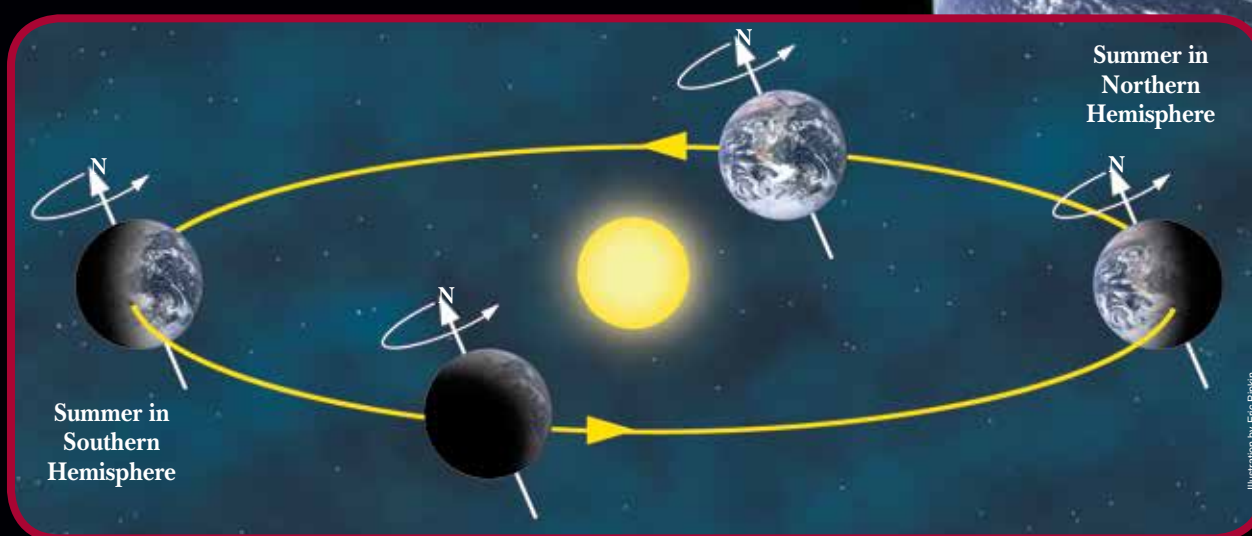




What causes the seasons?

Claud H. Sandberg Lacy, professor of physics, replies:

The rotational axis of the earth is tilted by 23.5 degrees from its orbital pole. Also, the direction of the earth's rotational axis does not change as the earth orbits the sun once a year. This fixed orientation of the earth's axis causes the Northern and Southern hemispheres of the earth to face the sun most directly at opposite times during the year due to the earth's orbital motion around the sun. When a hemisphere of the earth is facing the sun, it is more strongly heated by the sun's light during the day, so that hemisphere's temperature is higher and it is summer there. The opposite effect occurs in the hemisphere turned away from the sun, so when it's summer in the Northern Hemisphere, it's winter in the Southern Hemisphere. ■



What is a phobia? How is it different from fear?

Jeffrey M. Lohr, professor of psychology, replies:

Fear may be distinguished from phobia, but a phobia by definition is not mutually exclusive of fear. The two constructs may be viewed on a continuum in terms of severity with fear being the lesser of the two evils. Fear is a primary emotion that consists of cognitive (perceptions of harm and danger), behavioral (fight or flight–escape/avoidance) and physiological (sympathetic arousal) components. The interaction between the three components serves an evolutionary adaptive function of promoting safety and survival. Fear is a necessary and normal part of life. However, fear may translate into a “phobia” when the fear response is persistent, excessive and/or unreasonable. It is under these conditions that phobia becomes a diagnosable mental disorder.

Fear becomes a phobia when the fear response is caused by the presence or anticipation of a specific object or situation. Exposure to the specified object or situation almost invariably provokes an immediate fear response. Individuals with phobias often recognize that the fear they are experiencing in response to the specified object or situation is excessive or unreasonable. A phobia often results in avoidance, anxious anticipation or distress in response to the feared situation. Phobias will also interfere with the person's general functioning (i.e., occupational, social activities, interpersonal relationships). Types of phobias include but are not limited to animal (e.g., snakes), natural environment type (e.g., heights), blood-injection-injury type (e.g., blood draws), and situational type (e.g., airplanes) phobias.

There are other diagnosable anxiety disorders that have fear as a component but are not phobias. These include generalized anxiety disorder, posttraumatic stress disorder, acute stress disorder, obsessive compulsive disorder, panic disorder and anxiety disorder not otherwise specified. ■

Got a question? Send it to UA Q & A, 800 Hotz Hall, Fayetteville, AR 72701, or send questions by e-mail to <blouin@uark.edu>.